SERVICE INFORMATION

NORDMENDE
THOMSON TECHNOLOGY
TV
COLLECTION

Spectra SL 63 TD	992.654 A/E
Spectra SL 72 TD	992.675 A/E
Spectra SL 6361	992.654 J
Spectra SL 7261	992.675 J
Futurasound 63 TD	992.656 A/E
Futurasound 72 TD	992.677 A/E
Futurasound 6362 PIP	992.650 K
Futurasound 7262 PIP	992.678 K

Chassis DC-1
(IDC 2.1)
mit/con/with IMC 10

Diese Angaben und Hinweise sind ausschließlich für den Service des Fachhändlers bestimmt · Änderungen vorbehalten · Sämtliche Urheberrechte an diesen Texten und Zeichnungen stehen uns zu. Nachdrucke, Vervielfältigung – auch auszugsweise – nur mit unserer vorherigen Zustimmung zulässig. Alle Rechte vorbehalten. Questi dati e queste istruzioni sono riservati ai tecnici del servizio assistenza · Con riserva di modifiche
These instructions are for service dealers only · Subject to modification

Schaltbildhinweise

5V STBY zum Verbraucher

5V STBY von der Spannungsquelle

X = nicht angeschlossen

Alle nicht gekennzeichneten Dioden = 1N4148.

⚠ Sicherheitszeichen

Diese Bauteile sind bei Reparaturen nur durch die vom Hersteller geprüften und angegebenen Originalteile zu ersetzten, um die vorgesehene Betriebssicherheit zu gewährleisten.

Die in diesem Gerät entstehende Röntgenstrahlung ist ausreichend abgeschirmt.
Beschleunigungsspannung: max. 31kV.

Istruzioni sullo schema

5V STBY all'utenza

5V STBY dalla sorgente di tensione

X = non allacciato

Tutti i diodi non contrassegnati = 1N4148.

⚠ Simbolo di sicurezza

Questi componenti vanno sostituiti in caso di riparazione solo utilizzando ricambi originali collaudati e raccomandati dalla Casa costruttrice, al fine di garantire la sicurezza operativa originale.

I raggi X emanati da questo apparecchio vengono adeguatamente schermati.
Tensione di accelerazione: max. 31 kV.

Circuit notes

5V STBY to load circuit

5V STBY from voltage source

X = not connected

Diodes not designated all 1N4148.

⚠ Safety symbol

Components designated by the safety symbol should, when necessary for repair, only be replaced by original parts produced and proofed by the manufacturer. Only then the original operational safety can be guaranteed.

The X-ray radiation generated by this TV set is adequately screened.
Acceleration voltage: max. 31kV.

Service-Hinweis

Austausch des Kontroll- und Videotext-Moduls

Der gesamte Geräteabgleich ist in dem EEPROM (Position IT05, Type X24C16) gespeichert. Es befindet sich auf dem Kontroll- und Videotext-Modul (CVT 6...). Um bei einer Reparatur nach einem Austausch des Kontroll- und Videotext-Moduls den gerätespezifischen Abgleich beizubehalten, ist der Austausch wie folgt vorzunehmen:

1. Das alte Kontroll- und Videotext-Modul gegen ein neues austauschen.
2. Alle Funktionen überprüfen.
3. Wenn das neue Modul einwandfrei funktioniert, das Gerät wieder ausschalten und das EEPROM (Position IT05, Type X24C16) auf dem neuen Modul gegen das auf dem defektem Modul austauschen. Damit bleibt der gerätespezifische Abgleich erhalten.

Istruzione tecnica

Sostituzione del modulo di controllo e televideo

L'intero allineamento dell'apparecchio è memorizzato nell' EEPROM (Posizione IT05, tipo X24C16) il quale è situato sul modulo di controllo e televideo (CVT 6...). Al fine di conservare, dopo un eventuale intervento di riparazione con relativa sostituzione del modulo di controllo e televideo, l'allineamento specifico dell'apparecchio, si esegua la sostituzione come di seguito descritto:

1. Sostituire il modulo di controllo e televideo.
2. Verificare tutte le funzioni.
3. Se il modulo funziona correttamente, spegnere l'apparecchio e sostituire l'EEPROM (Posizione IT05, tipo X24C16) del nuovo modulo con quello del modulo guasto. In tal modo rimarranno conservati i parametri di allineamento specifici dell'apparecchio.

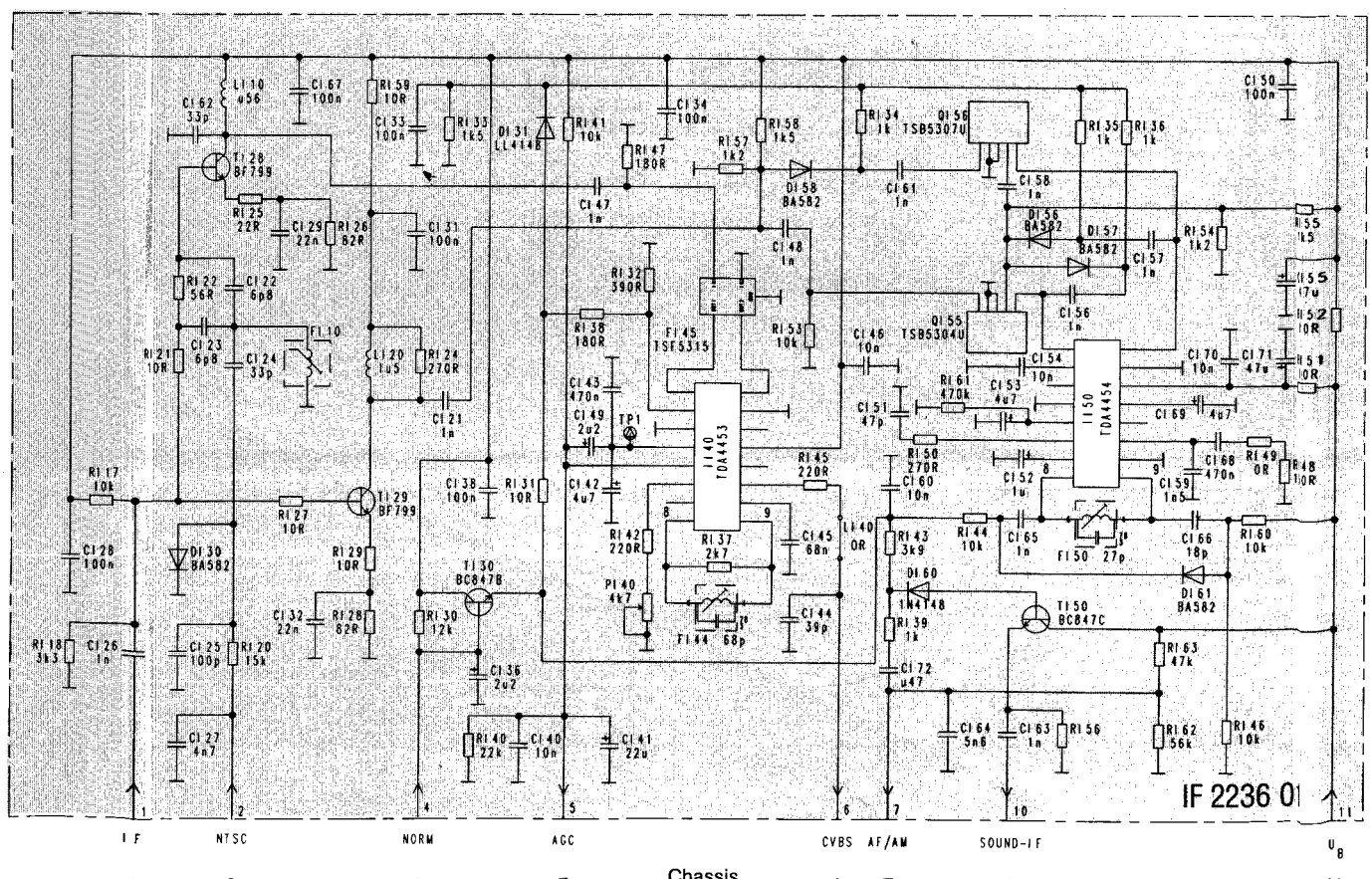
Service Instruction

Fitting a new control and teletext module

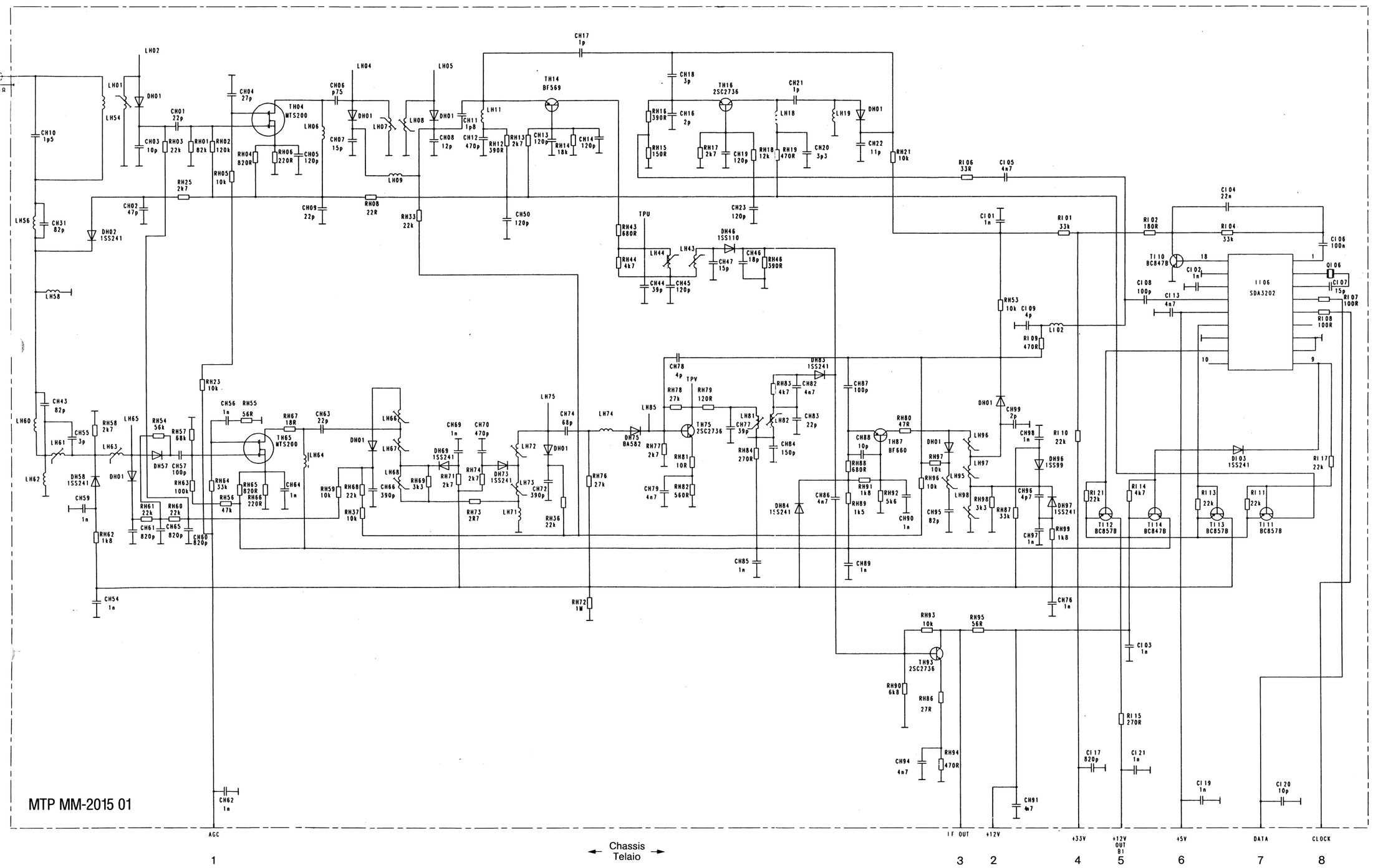
The entire set alignment is stored in the EEPROM (Position IT05, Type X24C16). The EEPROM is located on the control and teletext module (CVT 6...). When carrying out repairs the equipment-specific alignment can be retained after fitting a new control and teletext module by proceeding as follows:

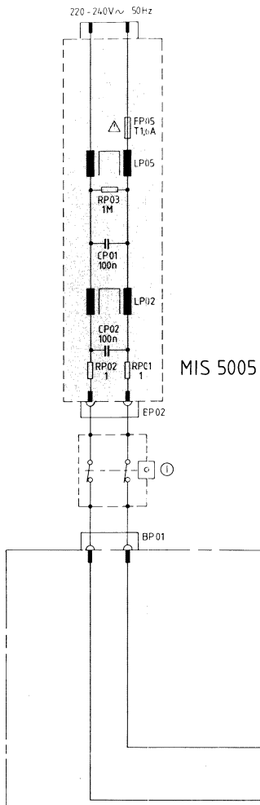
1. Replace the old control and teletext module with a new one.
2. Check all functions.
3. If the new module functions perfectly switch the TV set off again and replace the EEPROM (Position IT05, Type X24C16) on the new module with the EEPROM on the defective module. In this way the set-specific alignment is retained.

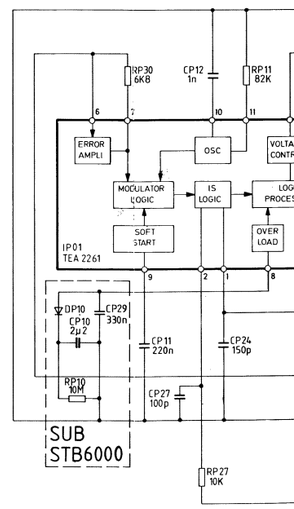
ZF / FI / IF



Tuner







Ach
Bei A
wend
gege
Pin 8

Atte
Per i
biso
tore
ambi
muta

Atte
Wher
in th
supp
be
agai
SMP

Achtung!
Bei Arbeiten am Schaltnetzteil Trenntrafo verwenden, und Messungen in diesem Bereich gegen Masse des Schaltnetzteils (LP 02/ Pin 8) ausführen.

Attenzione!
Per i lavori sull'alimentatore a commutazione, bisogna utilizzare un trasformatore separatore ed effettuare le misurazioni in questo ambito verso massa dell'alimentatore a commutazione (LP 02/Pin 8).

Attention!
When carrying out repair work on components in the primary circuit of the switch mode power supply (SMPS), an isolating transformer must be employed. Measurements to be taken against ground within the primary side of the SMPS (LP 02/Pin 8).

MIS 5005

Entmagnetisierung
Smagnetizz.
Degaussing

Schaltnetzteil
Alimentatore a commutazione
Switch-mode power supply (SMPS)

SUB
STB6000

PIP-Tuner (MTP PIP 2020)

Tuner MTP MM-2015 01

ZF / FI / IF IF 2236 01

(IF 2134)

IF OUT | +12V | +33V | +12V OUT B1 | +5V | DATA | CLOCK

3 2 4 5 6 7 8

SCI 6035 U
BX 01

SCI 6035 U
BX 01

ZF / FI / IF
IF 2236 01

(IF 2134)

CVT 6001 U
BT 09

CVT 6001 U
BT 10

(PIP TV 6000)
BX 01

(PIP TV 6000)
BX 02

CORE 6010 U
BV 01

CRT 6110 U
CRT 6113 U
BT 01

ZNS 6001 U
ZNS 6002 U
ZNS 6003 U
BG 01

ZNS 6001 U
ZNS 6002 U
ZNS 6003 U

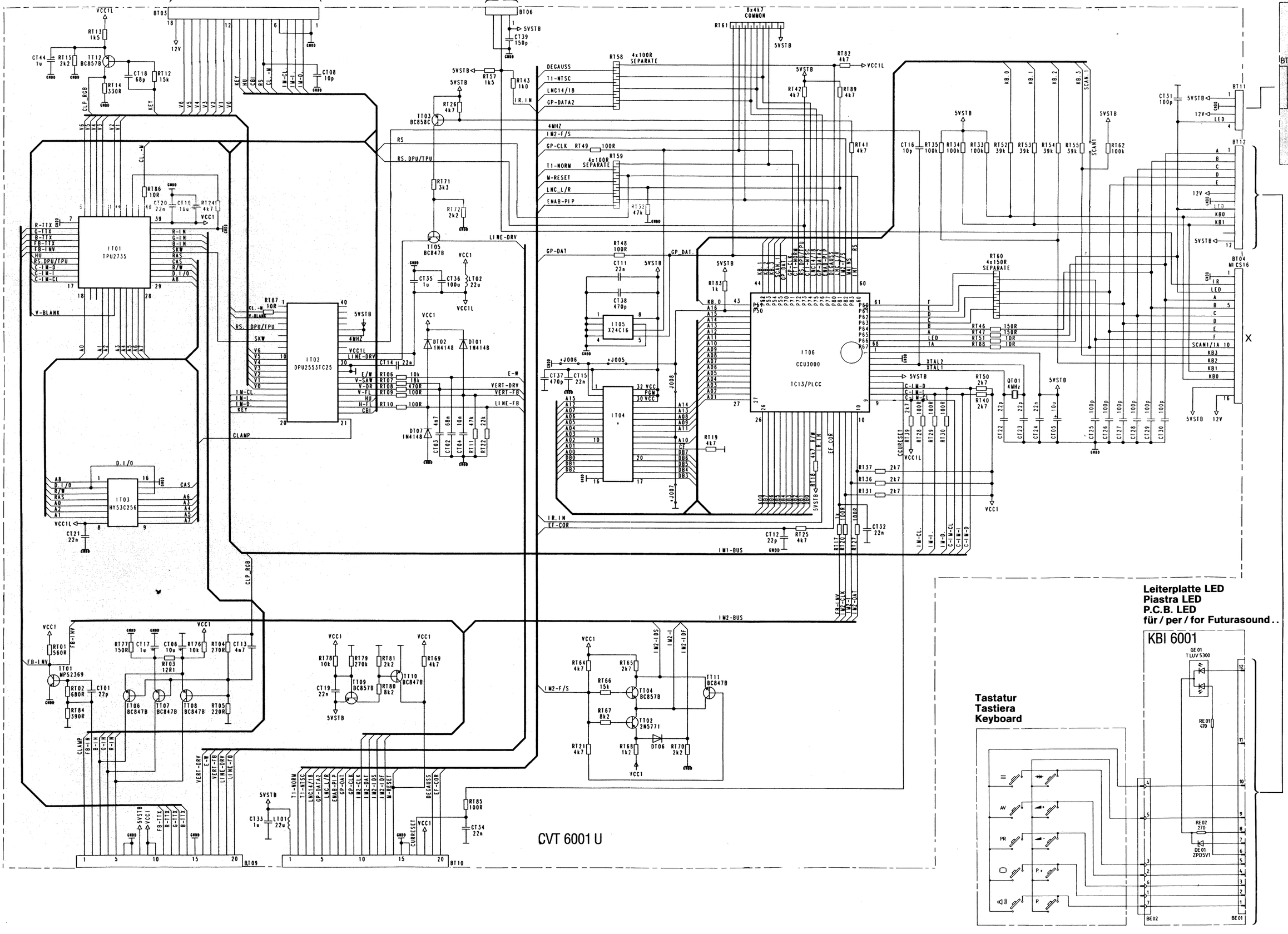
AM / FM 6005 10 U / BS 01

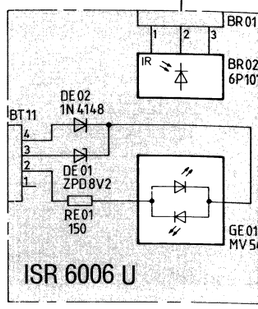
Vertikal / Verticale / Vertical

Horizontal
Orizzontale
Horizontale

O/W Korrektur
Correzione E/W
E/W Correc.

Kontroll- und Videotext-Modul
Modulo Controllo e Televideo
Control and Teletext Module



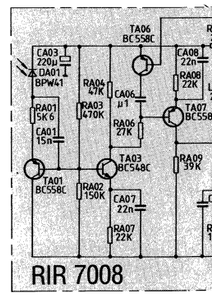


Infrarot-Vorverstärker
Preamplificatore infrarossi
Infra-red pre-amplifier
für / per / for Spectra SL ..

Leiterplatte LED
Piastra LED
P.C.B. LED
für / per / for Futurasound ..

Tastatur
Tastiera
Keyboard

Infrarot-Vorverstärker
Preamplificatore infrarossi
Infra-red pre-amplifier
für / per / for Futurasound ..



Infrarot-Vorverstärker
Preamplificatore infrarossi
Infra-red pre-amplifier
für / per / for Spectra SL ..

ISR 6006 U

Leiterplatte LED
Piastra LED
P.C.B. LED
für / per / for Futurasound ..

KBI 6001

Tastatur
Tastiera
Keyboard

Infrarot-Vorverstärker
Preamplificatore infrarossi
Infra-red pre-amplifier
für / per / for Futurasound ..

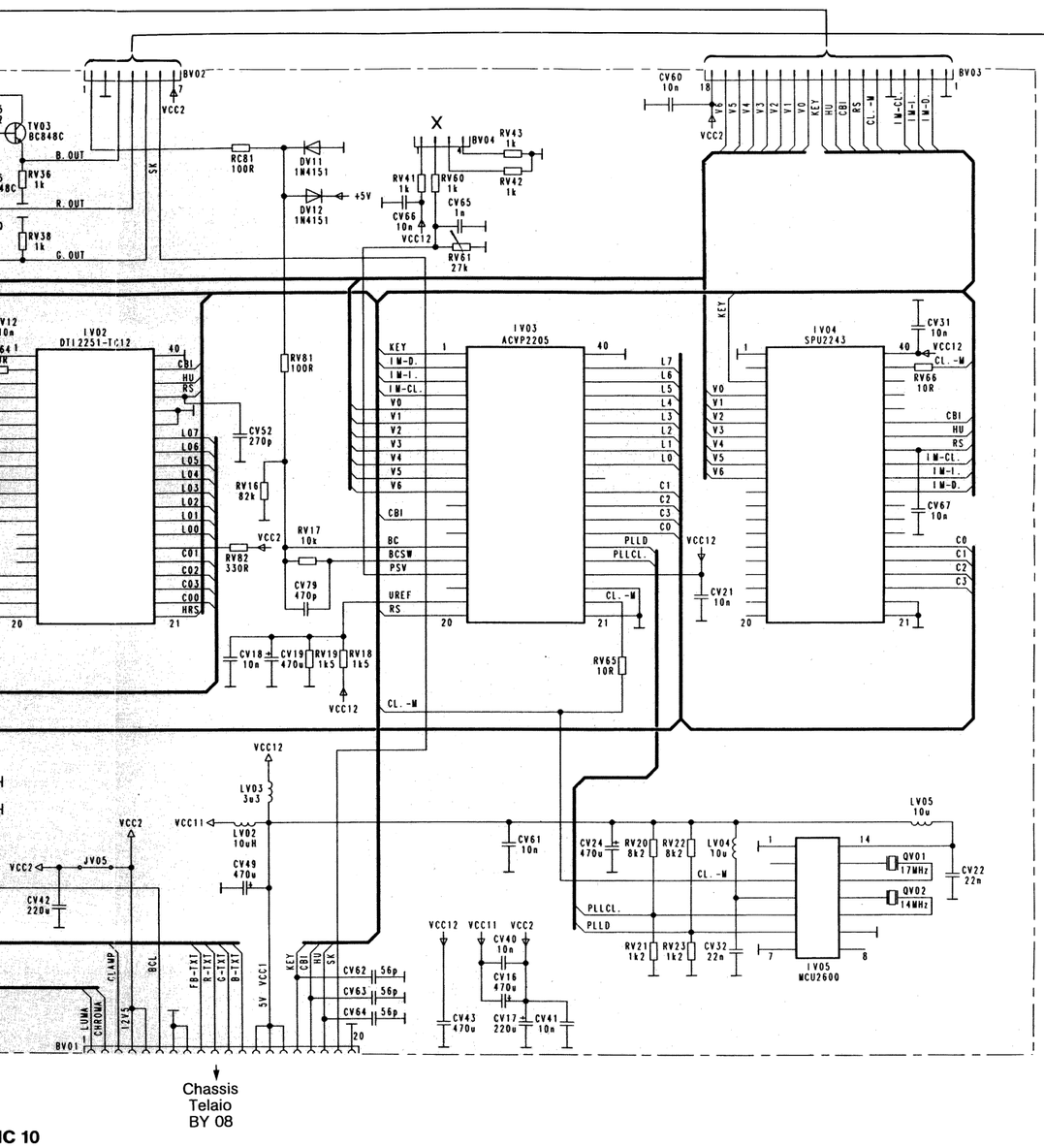
RIR 7008

Chroma-Video-Modul
Modulo crominanza video
Chroma video module

CORE 6010 U

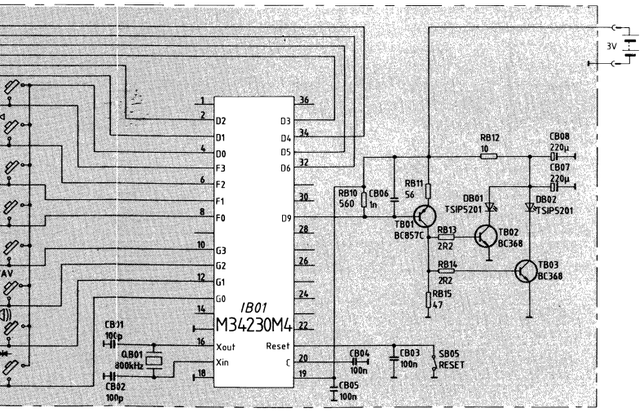
Chassis
Telaio
BY 08

Infrarot-Fernbedienung
Telecomando infrarossi **IMC 10**
Infra-red remote control



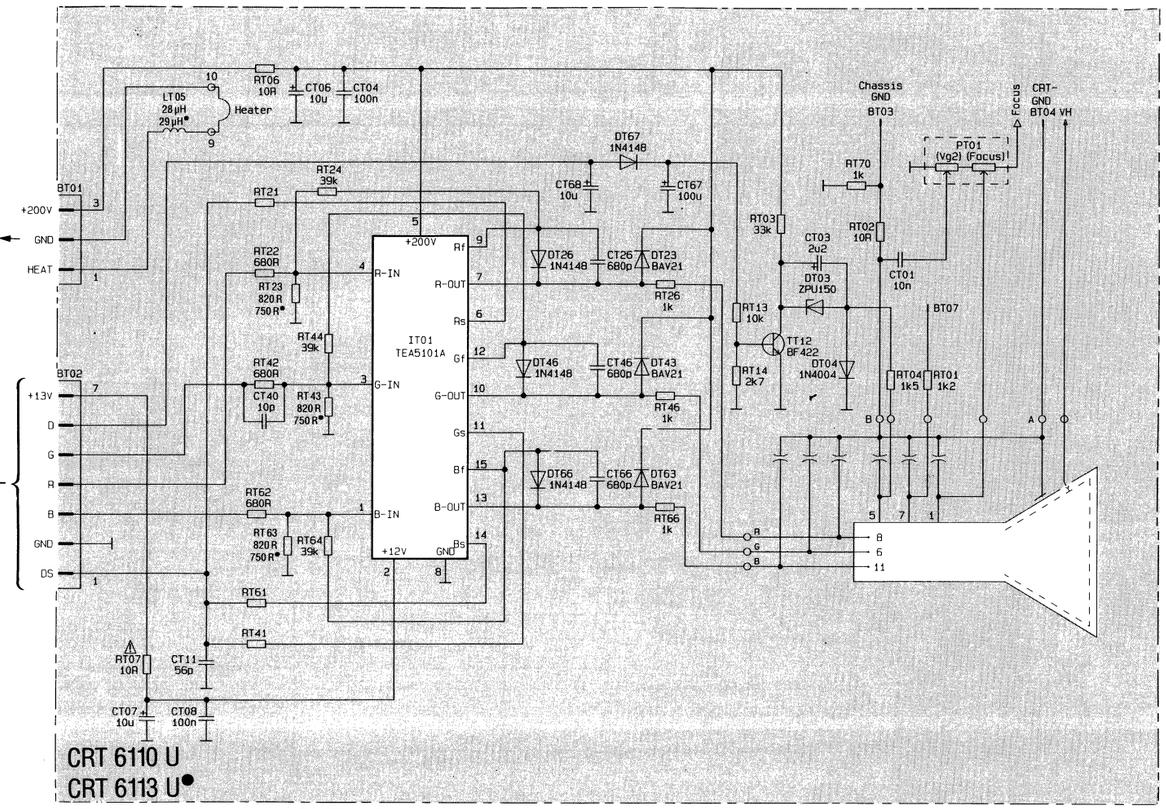
Chassis
Telaio
BY 08

IC 10



RGB-Endstufe
Stadi finali RVB
RGB Output Stage

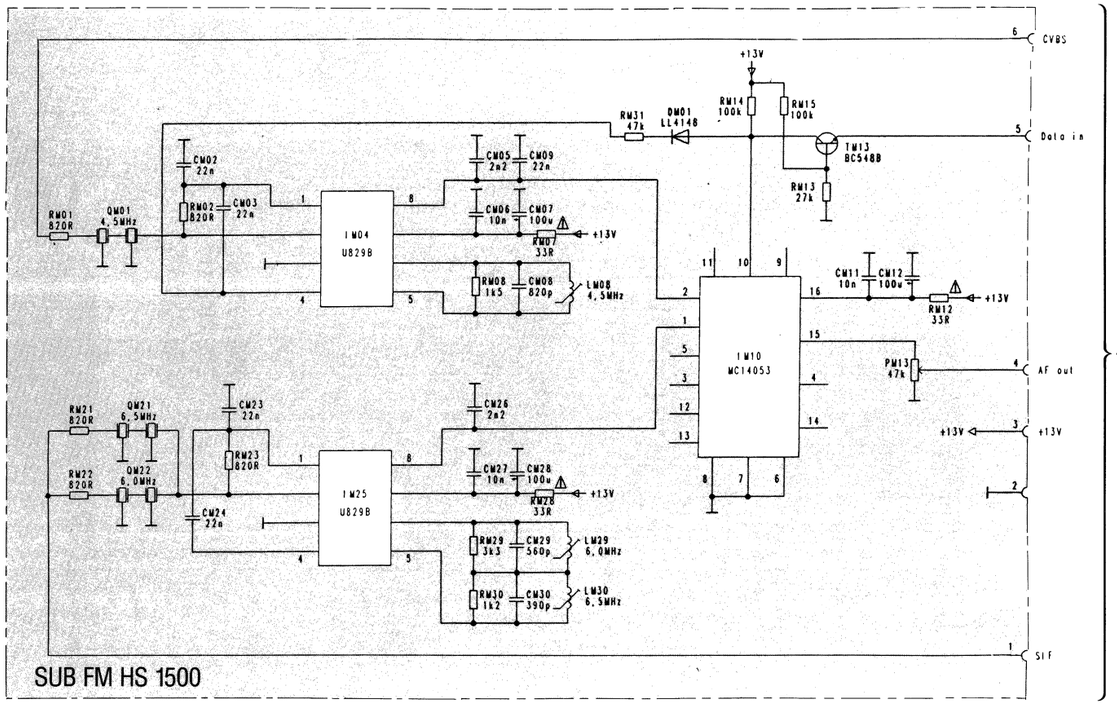
Chassis
Telaio
BV 01



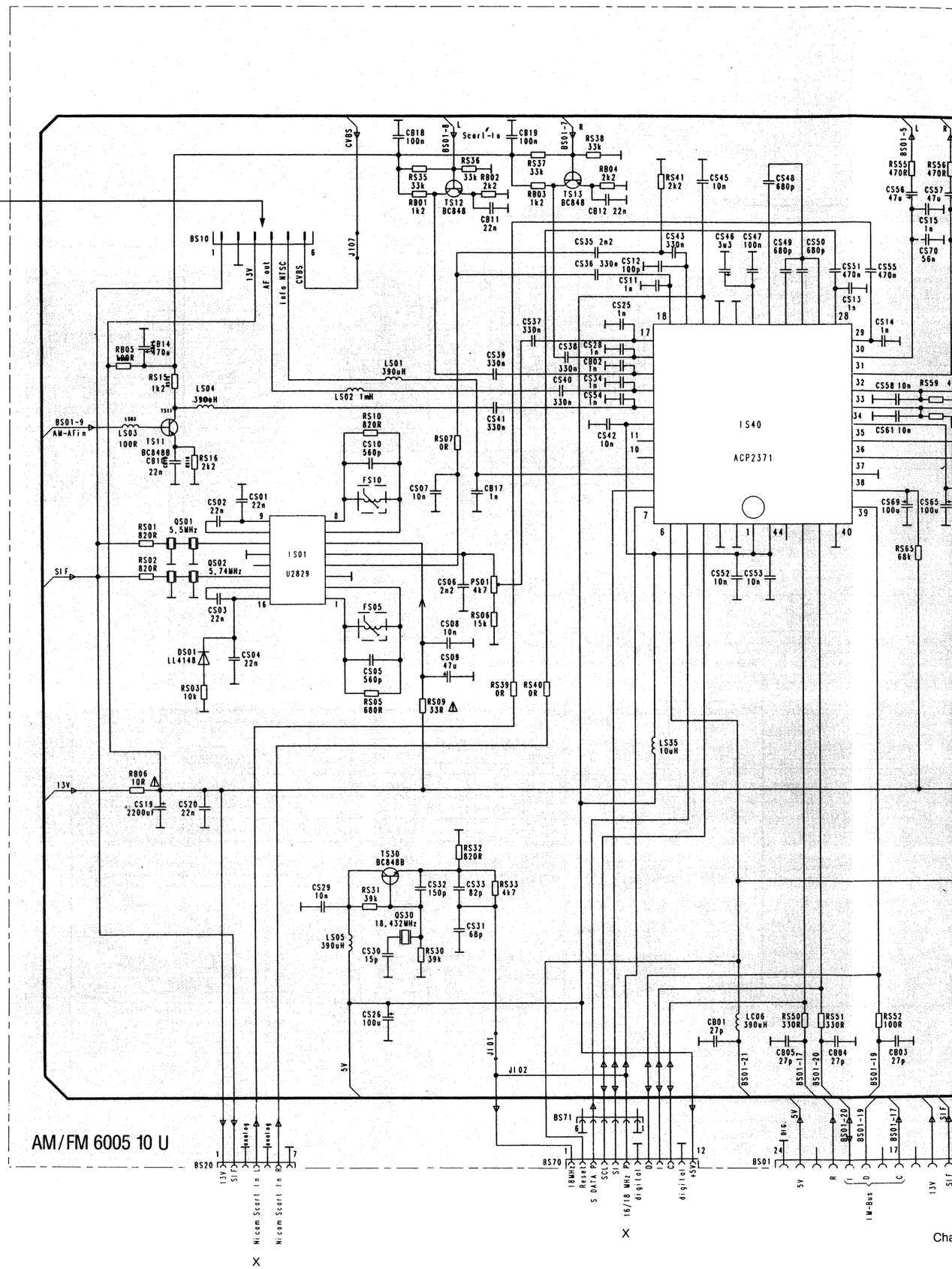
CRT 6110 U
CRT 6113 U●

CRT 6113 U → Futurasound 72 TD + Spectra SL 72 TD mit / con / with Black-King-Planar

Submodul
Submodulo 4,5 / 6 / 6,5 MHz FM
Submodule



Ton-Modul
Modulo audio
Sound module



X

X

FCB 6007 / 6013 U
BM 01

Surround

Surround

Chassis / Telaio
BB 03

Frequenzweiche
Deviatore di frequenze
Freq. divider network
für / per / for Spectra SL..

LDN 6007

LDN 6007 U

AM / FM 6005 U
BS 80

AM / FM 6005 U
BS 81

Frequenzweiche
Deviatore di frequenze
Freq. divider network
für / per / for Futurasound..

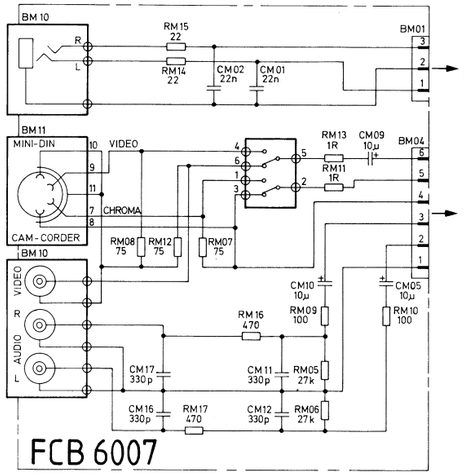
LDN 6008

LDN 6008

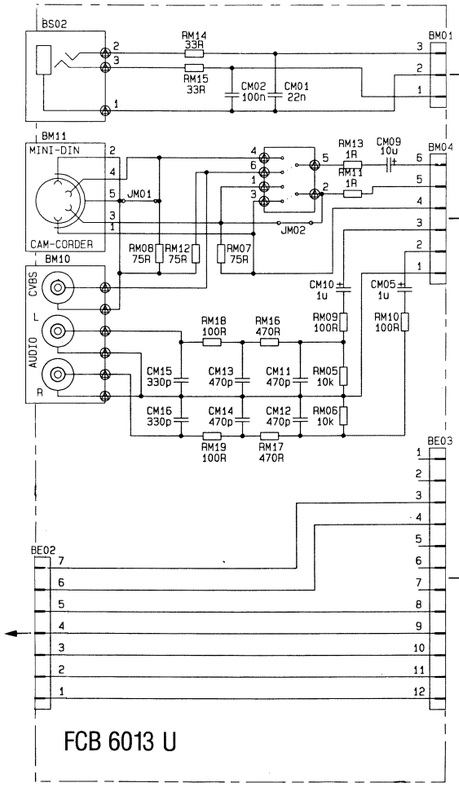
Submodul
Submodulo SUB MUTE IDC 2100
Submodule

SUB MUTE IDC 2100

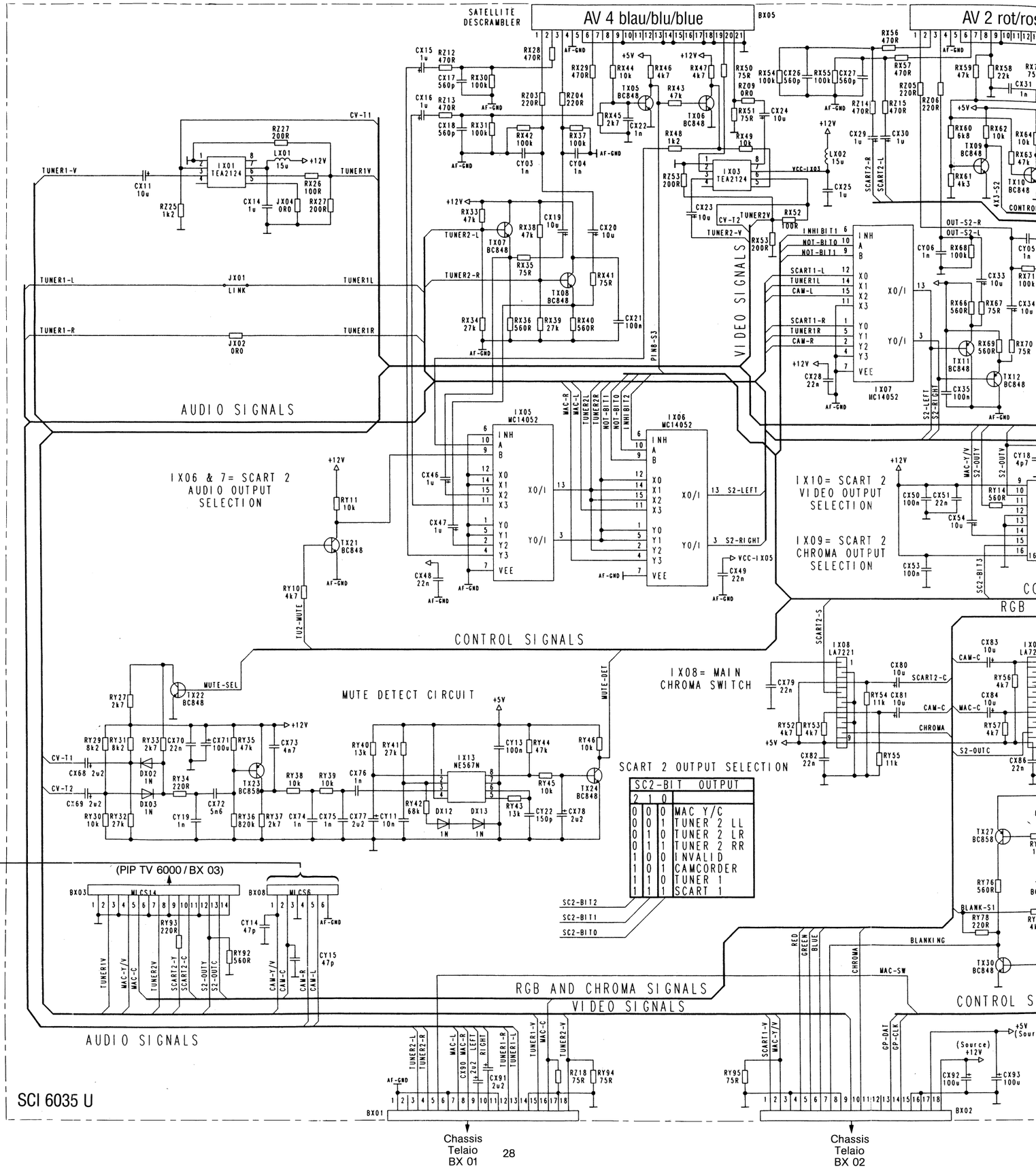
Frontbuchsen
Prese frontali
Front sockets
für / per / for Futurasound..



Frontbuchsen
Prese frontali
Front sockets
für / per / for Spectra SL..



Euro-AV-Buchsen Interface
Interfaccia Prese Peritelevisione
Scart Interface



Nord/Süd-Modul
Modulo Nord/Sud
North/South module

Chassis
Telaio
BL 01

HORIZONTAL

Chassis
Telaio
BF 01

BG01

to CHASSIS
(vert.)

gn
sw

LG23¹ 60uH
CG22 47n
LG22

-20V

rt
sw

RG39 4R7
LG39
CG39 100n 120²

RG 36 680R
RG37 10k
CG33 2n2
RG32 6k8
TG37 BC557B
TG38 BD137-16
RG31 390k
RG33 2k2
RG34 1k

RG20¹·³ 150k
CG28¹ 220p
TG29 BC547B
-10V

RG81 330k
RG83 2k2
RG84 1k
TG81 BD137-16
TG82 BC557B
RG82 15k
RG87 6k8
RG86 680R
CG87 100n 120n²
LG87
RG89 4R7

RG19 10k
DG28 1N4148
DG29 1N4148
RG27 3k3
RG28 10k
CG781 100p
TG79 BC547B
RG78 10k
RG77 3k3
DG78 1N4148
DG71 1N4148
RG79 270k
CG81 4n7
RG69 10k

RG26 1k
TG26 BC547B
RG29 4k7
CG30 150p
RG30 1k
-20V
RG75 1k
TG76 BC547B
RG74 4k7
RG76 1k

CG68 220p
-10V
-20V
-10V
-20V

IG68 MC14046B
SIGIN COMP
PCOMP1 PCOMP2
PPULSE
VCOIN INH
VCOOUT
DMOD
C1-1 C1-2 R1 R2
ZENER
VDD VSS

IG69 MC14526B
VDD=VSS
CLOCK
PE
"0"
INHIBIT
RESET
VSS

CG67 u22
RG67 330R
CG66 680p
RG66 8K2
-20V

RG68 2k2

RG41 4k75 8k25²
RG42 39k2
IG01 1/4 TL084
CG03 1n
RG03 47k
RG02 18k7
CG02 2u2
LG91
RG91 2R2

CG43 1n
PG46 47k
DG46 1N4148
RG43 1k0
RG44 47k
PG44 47k
DG44 1N4148

TG62 BC557B
RG61 150k
CG61 4n7
CG62 100n
RG62 475R
RG65 82k5
RG64 4k7
RG63 470R
DG91 BYT01-400

RG93 2K2
DG93 10V
CG93 100u
CG91 220u
RG92 220R
CG92 100u
DG92 20V
-20V

ZNS 6001 U¹
ZNS 6002 U²
ZNS 6003 U³

BG01

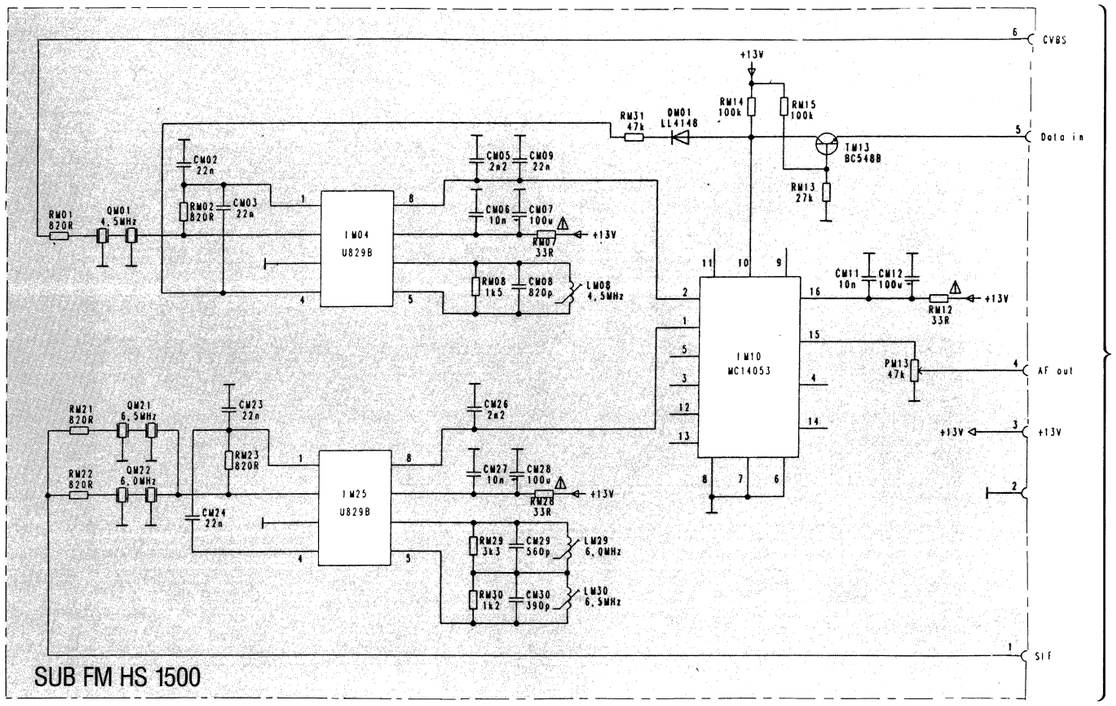
V H

Chassis
Telaio
BG 01

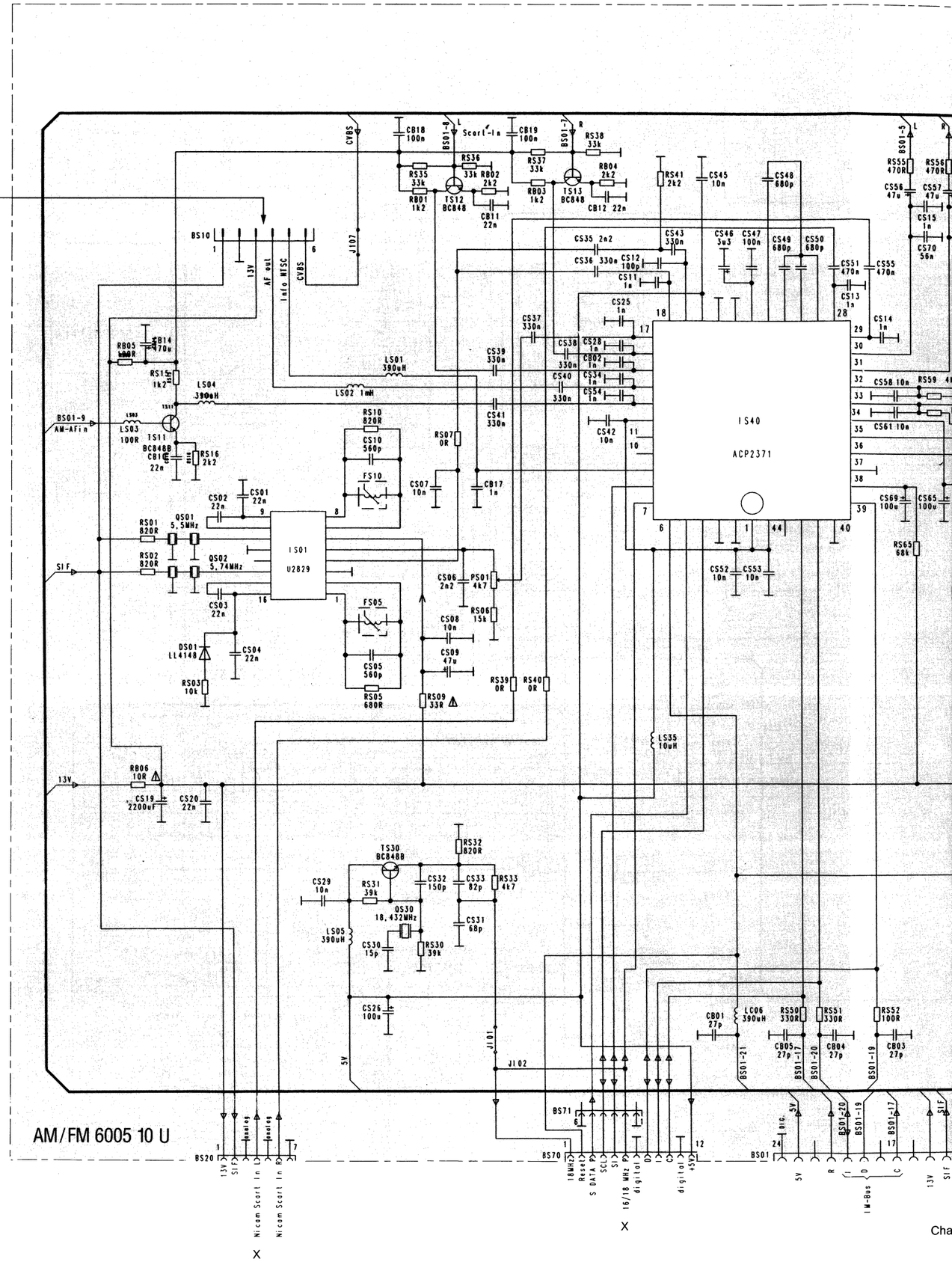
ZNS 6001 U → Futurasound 63 TD / 6362 PIP + Spectra SL 63 TD / 6361
ZNS 6002 U → Futurasound 72 TD + Spectra SL 72 TD mit / con / with Black-King-Planar
ZNS 6003 U → Futurasound 72 TD / 7262 PIP + Spectra SL 72 TD / 7261

VERTICAL

Submodul
Submodulo 4,5 / 6 / 6,5 MHz FM
Submodule



Ton-Modul
Modulo audio
Sound module



FCB 6007 / 6013 U
BM 01

Surround

Surround

Chassis / Telaio
BB 03

Frequenzweiche
Deviatore di frequenze
Freq. divider network
für / per / for Spectra SL..

LDN 6007

LDN 6007 U

AM / FM 6005 U
BS 80

AM / FM 6005 U
BS 81

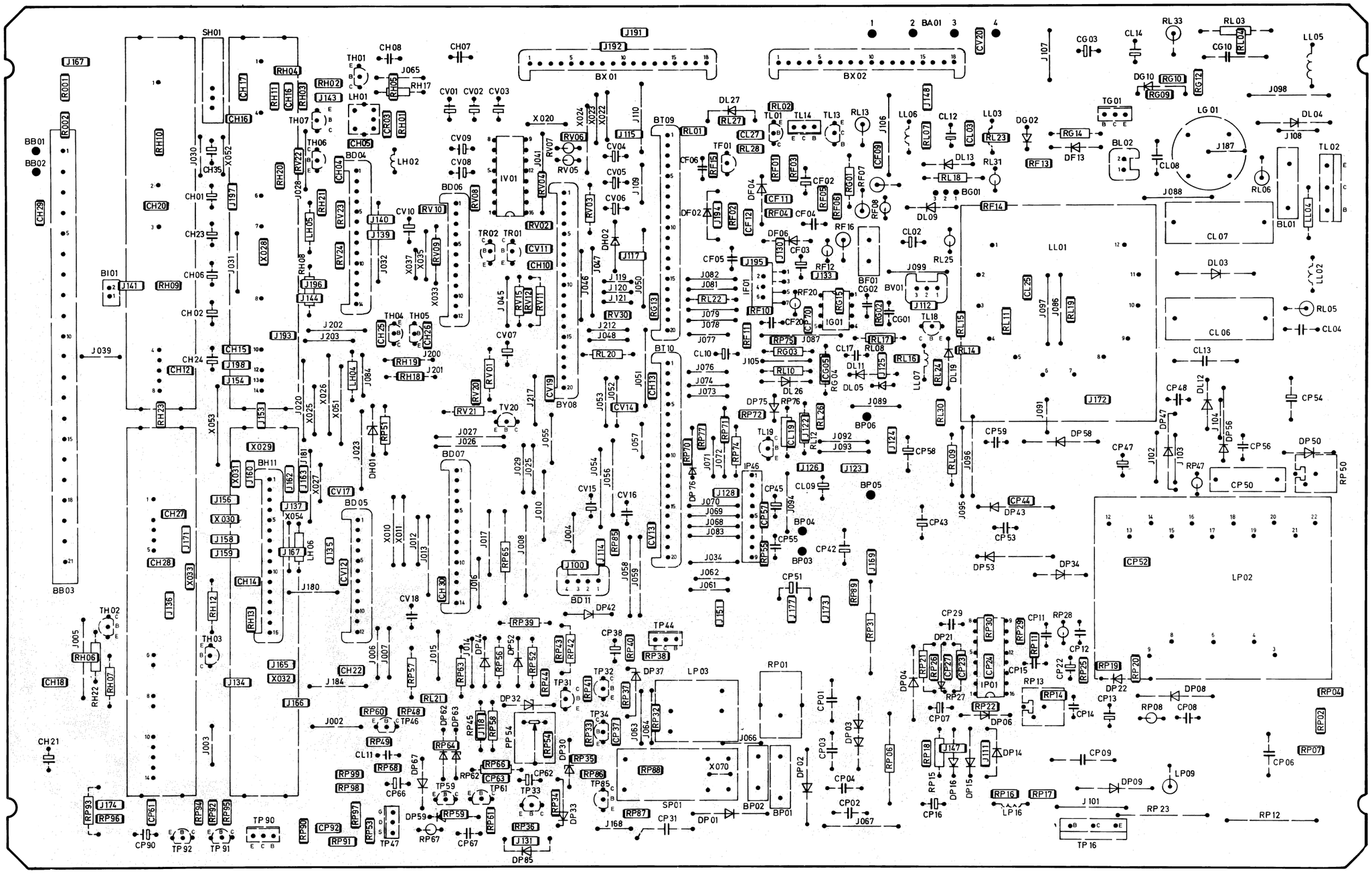
Frequenzweiche
Deviatore di frequenze
Freq. divider network
für / per / for Futurasound..

LDN 6008

LDN 6008

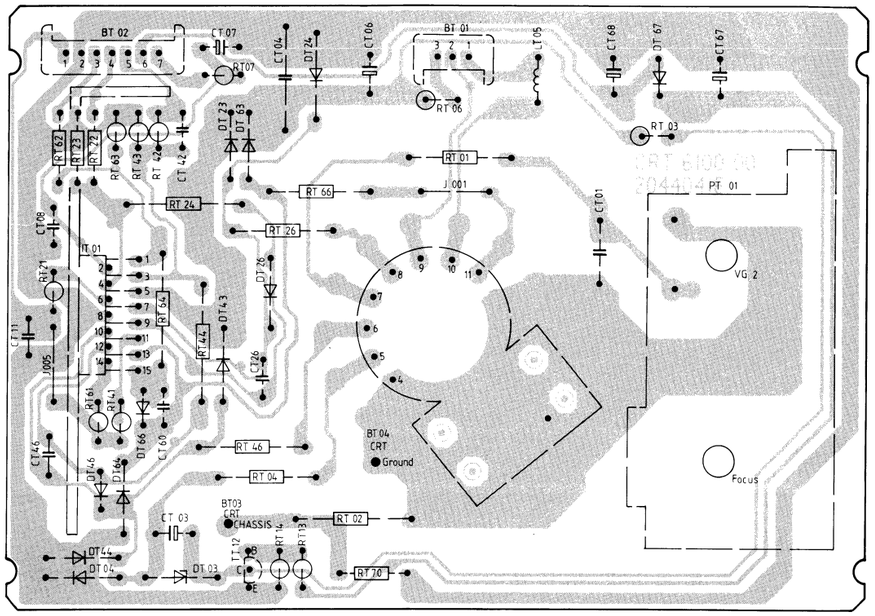
Submodul
Submodulo SUB MUTE IDC 2100
Submodule

SUB MUTE IDC 2100

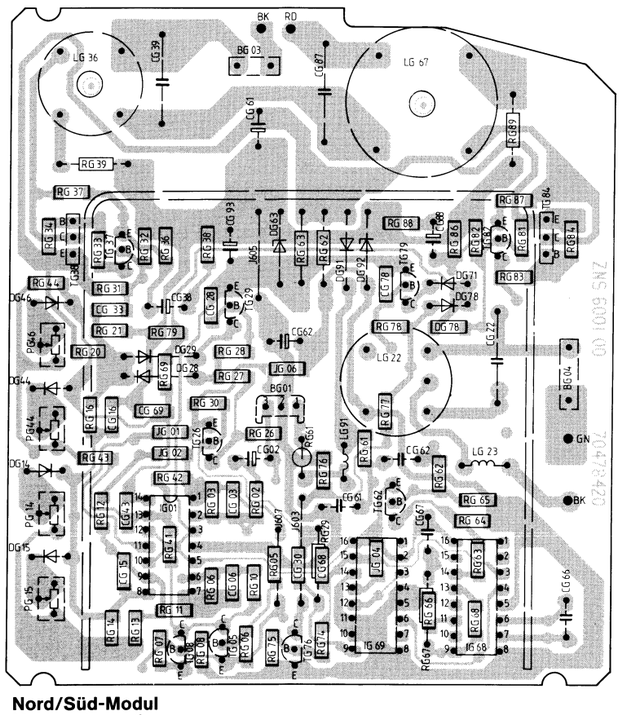


Chassis / Telaio
Lötseite – je nach Ausführung bestückt
Lato saldature – montati secondo le versioni degli apparecchi
Soldered side – inserted according to versions

NORDMENDE
THOMSON TECHNOLOGY



RGB-Endstufe
Stadi finali RVB
RGB Output Stage
Lötseite – je nach Ausführung bestückt
Lato saldature – montati secondo le versioni degli apparecchi
Soldered side – inserted according to versions



Nord/Süd-Modul
Modulo Nord/Sud
North/South module
Lötseite – je nach Ausführung bestückt
Lato saldature – montati secondo le versioni degli apparecchi
Soldered side – inserted according to versions

TECHNICAL SERVICE

DEUTSCHLAND

NORDMENDE GmbH
2800 **Bremen 44**
Technischer Kundendienst
Funkschneise 13
Tel.: 04 21 / 45 85-0

2000 **Hamburg 26**
Vertragskundendienst
UE-Service Neven GmbH
Eiffestraße 76
Tel.: 0 40 / 25 20 66

1000 **Berlin 31**
Vertragskundendienst
Neven & Dewitt GmbH i. G.
Hohenzollerndamm 188
Tel.: 0 30 / 86 00 01 30

3000 **Hannover 1**
Vertragskundendienst
DW Service GmbH
Haltenhoffstraße 52 – 54
Tel.: 05 11 / 71 40 73

4300 **Essen 12**
Vertragskundendienst
Audio Video Service
F & G GmbH
Teilungsweg 29
Tel.: 02 01 / 33 33 34

6072 **Dreieich-Dreieichenhain**
Vertragskundendienst Dreieich/Frankfurt
TV-AV Service
Nosper GmbH
Heinrich-Hertz-Straße 3
Tel.: 0 61 03 / 8 20 73

3501 **Kassel-Fuldabrück 1**
Vertragskundendienst
Voigt & Co.
Ederweg 8
Tel.: 05 61 / 58 36 00

6800 **Mannheim 1**
Vertragskundendienst
Werner Busalt
U 6, Nr. 6
Tel.: 06 21 / 2 11 57

8500 **Nürnberg-Süd**
Vertragskundendienst
Mildner Elektrotechnik GmbH
Sperberstraße 47
Tel.: 09 11 / 44 99 40

8000 **München 46**
Vertragskundendienst
CED
Audio-Video Reparatur GmbH
Heidemannstraße 166 c
Tel.: 0 89 / 31 88 09 20

7022 **Leinfelden-Echterdingen 2**
Vertragskundendienst
Wagner AV-Technik
Max-Eyth-Straße 3
Tel.: 07 11 / 7 94 29 67

O-2520 **Rostock 22**
Vertragskundendienst
HiFi-TV-Video GmbH Weigel & Co.
Stockholmer Straße 1 B
Tel.: 03 81 / 71 70 56

O-3018 **Magdeburg**
Vertragskundendienst
RFN Rundfunk und Fernsehen Nord
Kastanienstraße 39
Tel.: 03 91 / 22 34 41

O-5084 **Erfurt**
Vertragskundendienst
PGH Television
Spielbergtor 19
Tel.: 03 61 / 2 23 91

O-7050 **Leipzig**
Vertragskundendienst
Gehado-Service
Torgauer Straße 62
Tel.: 03 41 / 69 18 45

Dresden
Vertragskundendienst
RAFENA-Fernsehdienst
Dresdener Straße 42
O-8142 Radeberg
Tel.: 03 51 / 4 41 03 62

EUROPA

Andorra
Electrizitat Martinez
Avinguda Tarragona, 63
Andorra – La Vella

Belgien
RADELCO N.V.
Bredabaan, 960
B-2170 Merksem

England
NORDMENDE
In GB Nordmende is
distributed by Ferguson
P.O. Box 1140
Enfield
Middlesex
EN1 1NB

Frankreich
STEV (Service Télévision)
63 A, rue d'Illzach
F-68100 Mulhouse

Griechenland
TEVELLAS-NORDMENDE A.B.E.
Lamia National Road
GR-Athen

Irland
Consumer Electronics (IRL) Ltd.
16 Western Parkway Business Centre
Lower Ballymount Road
IRL-Dublin 12

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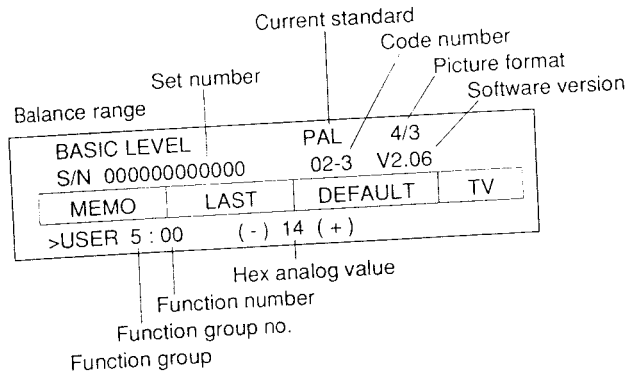
Service Mode

Service Mode is required for aligning the TV set. All settings are made using the remote control (except for primary voltage, focusing, screen grid voltage and North/South alignment).

1. Switching on Service Mode

1.1 Switch the TV set to stand-by using the remote control.
1.2 Switch off the set using the power switch and wait until the LED on the set goes out.
1.3 Hold down the red 🔊 button and, at the same time, switch on the set with the power switch. Hold down the red 🔊 button until the LED on the set glows green.
1.4 The following menu will appear:



Important: Service Mode cannot be switched on if any equipment is activated at a Scart socket, i.e. switching voltage is present.

2. Function selection

To select the individual aligning functions, first select the function group with the buttons **1** - **0/AV**. In the case of groups 10 and 11 first hold down button **1** until 1 - : - - is displayed and then press button **0** or **1**.

Button input = Function group no.	Functions	Function group Display
1	D2-MAC	MAC 1 : - -
2	PIP	PIP 2 : - -
3	Video and Sound	VIDEO 3 : - -
4	Geometry	GEOMETRY 4 : - -
6	Set configuration	CONFIG1 6 : - -
9	Set configuration	CONFIG4 9 : - -
1, 0	Set configuration	CONFIG5 10 : - -
1, 1	Configuration of the selected program position	PR-DATA 11 : - -

After selecting the function group, select the function by means of a two-digit number. If a non-existent number is entered by mistake, the message NOT VALID - : - - appears. The function group and function number must then be re-entered.
Press button **ZOOM +** or ☰ to move to the next function number within the same function group and press the **ZOOM –** button or the ⇤ button to call up the preceding function number. To select functions from other function groups, the corresponding function group number must be entered and then the two-digit function number.

Function group MAC 1:

Function number	Function
00	D2-MAC reference oscillator

Function group PIP 2:

Function number	Function
08	PIP PAL Reference Oscillator
09	PIP NTSC Reference Oscillator

Function group VIDEO 3:

Function number	Function
03	PAL Reference Oscillator
04	NTSC 3.58 MHz Reference Oscillator

Function group GEOMETRY 4:

Function number	Function
00	Vertical Shift
01	Width
02	Horizontal Shift
03	Parabola top
04	Parabola bottom
05	Height
06	East/West Correction
07	Trapezium
08	East/West Correction middle
09	Trapezium middle

Function groups CONFIG and PR-DATA 11

See under Set Alignment, 2nd paragraph "Set Configuration".

3. Switching between Service Mode and TV Mode

In Service Mode the normal TV functions cannot be operated. If they are required in Service Mode (e.g. program change) it is possible to switch to and fro between Service Mode and TV Mode using the blue **VT** button.

4. Alignment of the selected function and storing

The current value of the selected function is given in hexadecimal form on the right-hand side of the function number and can be changed for alignment purposes using the **+** and **–** buttons on the remote control.
Using the green ☐ button all the values of the current function group can be reset to the state which existed after they were last stored (the values from the EEPROM - Position IT05 - are called up).
If the yellow **P.** button is pressed, all the values of the current function group are put to a basic setting (the values from the ROM - Position IT04 - are called up). However this is only a visable if a new EEPROM (Position IT05) has been fitted in order to put the set into a functional basic setting.
The alignment is stored by pressing the red 🔊 button. The values are then stored in the EEPROM (Position IT05) and "MEMO" is displayed briefly as confirmation. All the values of the selected function group are stored at the same time! The various groups of the set configuration are stored together as a block.

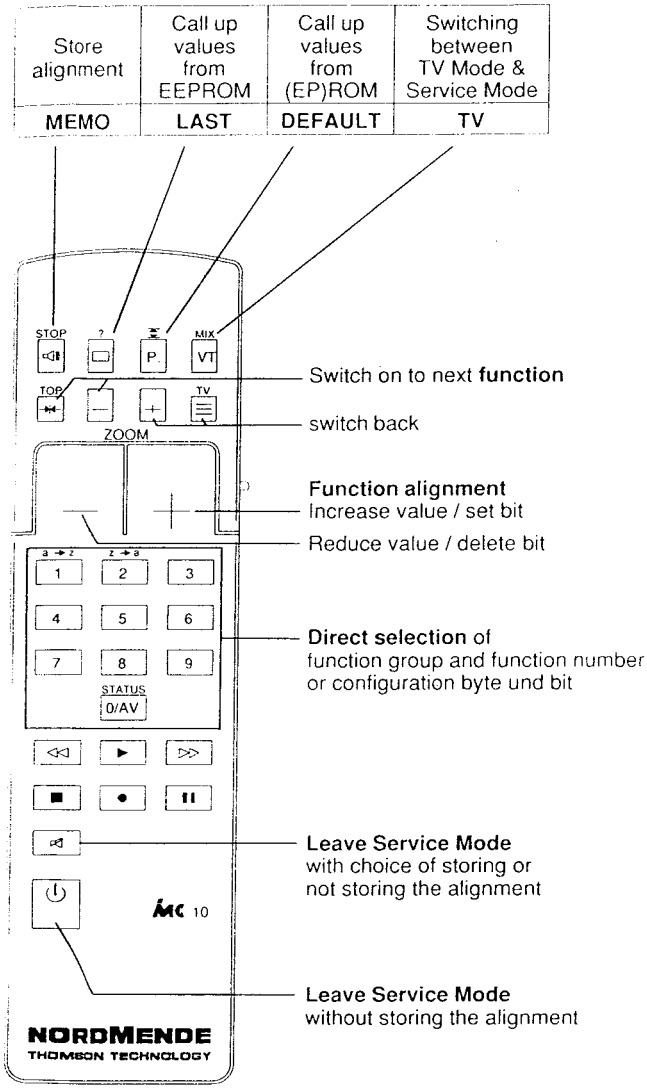
5. Switching off Service Mode

To switch off Service Mode press the 🔇 button. The following message then appears in the second line of the menu:

MUTE (TO EXIT) RED (TO STORE)

It is now still possible to store with the red 🔊 button or to end Service Mode by pressing the 🔇 button and holding it down for a time. It is also possible to switch direct from Service Mode to Standby by pressing the ⏻ button. In this case all the changed values which have not been stored are reset to their previous state.

6. Functions of the remote control buttons in Service Mode



Function group	Function group no.	Function no. = Bit no.	Function	Bit status
CONFIG1	6	01	Zoom keys for teletext	1
			Volume keys for teletext	0
CONFIG4	9	04	NTSC 3.58 MHz via AV	1
			NTSC 4.43 MHz via AV	0
CONFIG5	10*	03	Balance screen grid voltage On	1
			Balance screen grid voltage Off	0
		04	IC in position IS40 on sound module = ACP2371-T1	1
			IS40 = ACP2371-P1	0
		05	Bass and treble control	1
			5-band equalizer	0
PR-DATA	11*	06	AV time constant	1
			TV time constant	0

*To select function group 10 or 11, press button 1 and hold it down until 1 - : - - appears and then briefly press button **0** resp. **1**.

Example for a configuration change
(Switch on NTSC 3.58 MHz for AV)

2.1 In Service Mode press button **9** to select function group CONFIG4.

2.2 Select function number 04 using the **0** and **4** buttons. A bit sequence is displayed:

CONFIG4 9 : 04 (-) 00001000 (+)
Bit 7 Bit 0

The function number corresponds to the number of the bit, which can be set to 1 with the + button or reset to 0 with the - button.

2.3 Press the + button to set bit 4 to 1. NTSC 3.58 MHz is thereby selected via AV.

2.4 Press the red button to store. "MEMO" is briefly displayed as acknowledgement.

2.5 To switch off Service Mode press the button until the service menu disappears.

The factory setting is such that the **AV time constant** is switched on for program positions ending in 9 (9, 19, ..99). This setting can be changed for each program position in the function group PR-DATA 1 1, function number 06 (e.g. switch on the AV time constant for program position 5 and switch it off for program position 9). In this case it is essential to store after changing the time constant and before switching over to the next program position to be changed.

Set alignment

Apart from the primary voltage and focusing, all other settings are performed in Service Mode.

Alignment sequence:

1. Primary voltage
2. Set configuration
3. Screen grid voltage
4. Focusing
5. Reference oscillator for PAL and NTSC
6. Geometry
7. PIP alignment

1. Primary voltage

Set the brightness and contrast to the middle position. Using PP54, set 148V on the cathode of DP56.

2. Set configuration

The operating parameters are fixed by the set configuration. The following parameters can be changed in Service Mode if required:

3. Screen grid voltage

3.1 Allow the set to warm up for at least 10 minutes.

3.2 Switch on Service Mode.

3.3 Select function group 10: press button **1** and hold it down until 1 - : - - appears. Then press button **0**.
Display: CONFIG5 10 : - -.

3.4 Select function 03: press buttons **0** and **3**.
Display: CONFIG5 10 : 03 (-) 10000001 (+).
In case of incorrect input the procedure can be repeated starting from point 3.3.

3.5 Press + button. Display: CONFIG5 10 : 03 (-) 10001001 (+).
Colour, brightness and contrast are now automatically set to minimum.

3.6 Press the blue **VT** button and then the button. A scale is displayed and above it a decimal value (G2 = . . .).

3.7 Set the pointer of the displayed scale to the middle position using screen grid controller V_{G2} on the picture tube terminal board. The decimal value should then be 090 +/-10. If the setting is within this tolerance the background colour of the scale changes from red to green.

3.8 To switch off the set and Service Mode press the button.
If the set is required to remain in Service Mode for further settings,

first press the blue **VT** button. This causes the scale for screen grid voltage to disappear. Then press the **–** button. Brightness, contrast and colour are reset to their previous values. Then the function group for the next alignment step can be selected.

4. Focusing

Feed in the grid test picture. Set brightness and contrast to 30%. Focus the grid optimally using the focus controller on the picture tube terminal board.

5. Reference oscillators for PAL and NTSC

5.1 Store a PAL test pattern on a program position and an NTSC test pattern (3.58 MHz) on another program position.

5.2 Switch on Service Mode and switch to the program position with the PAL test pattern.

5.3 Select function group VIDEO 3 and then function number 03. Synchronization of the PAL reference oscillator is now switched off. Now use the **+** and **–** buttons to set to the slowest possible run-through of the colours.

5.4 Store the alignment with the red 🔊 button.

5.5 To switch the synchronization on again, another function group and function number must be selected (e.g. GEOMETRY 4 : 00 with the buttons **4**, **0**, **0** = vertical shift) before switching off Service Mode.

5.6 Switch to TV Mode with the blue **VT** button and switch on the program position with the NTSC 3.58 MHz colour test pattern. Switch back to Service Mode with the blue **VT** button.

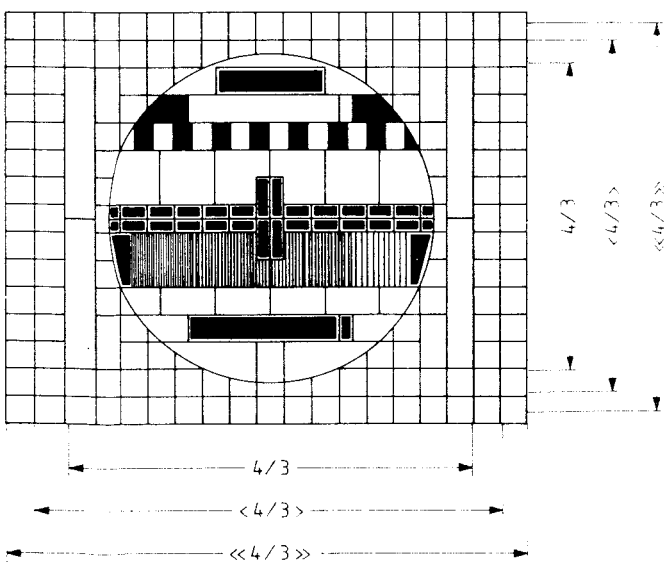
5.7 Select function group VIDEO 3 and then function number 04. Synchronization of the NTSC reference oscillator is now switched off. Now use the **+** and **–** buttons to set to the slowest possible run-through of the colours.

5.8 Store the alignment with the red 🔊 button.

5.9 To switch the synchronization on again, another function group and function number must be selected (e.g. GEOMETRY 4 : 00 with the buttons **4**, **0**, **0** = vertical shift) before switching off Service Mode.

6. Geometry

The geometry must be set separately for 4/3, <4/3> and <<4/3>> zoom stages in conjunction with the PAL/SECAM, NTSC 3.58 MHz and NTSC 4.43 MHz standards respectively. Of course, the resulting 9-fold alignment does not always need to be carried out in full, but only according to requirement. The important thing is to always store after alignment has been carried out for any one zoom stage and standard before changing to another standard or zoom stage.



6.1 Vertical shift

Select the station test pattern. In Service Mode select GEOMETRY 4 function group and then function number 00. Using the **+** and **–** buttons, shift the top limit of the image for the relevant zoom stage (see picture test pattern illustrated above) to the top picture border.

6.2 Height

Press the **ZOOM +** button repeatedly until function number 05 is selected. Using the **+** and **–** buttons, shift the bottom limit of the image for the relevant zoom stage to the bottom picture border. If necessary, repeat Item 6.1. Store the alignment using the red 🔊 button.

6.3 North/South alignment

The North/South alignment is performed conventionally with controllers which are all located on the North/South module.

a) Preparation

Feed in the grid test pattern and, in service mode, alter the vertical shift (function number 00) and picture height (function number 05) so that the topmost and bottommost lines are just visible. Important: Do not store the setting!

b) North/South symmetry

Turn controllers PG44 and PG46 on the North/South module clockwise to the limit stop. Use the coil LG87 to adjust the deflection symmetrically to the middle of the topmost and bottommost lines.

c) North/South correction

Use PG46 to adjust the topmost line so that it is straight. Adjust the bottommost line with PG44.

d) Gullwing symmetry

Turn PG14 and PG15 clockwise to the limit stop. Use LG39 to adjust the gullwing correction symmetrically to the middle of the 2nd line from the top and from the bottom. Note: The coil cores of LG39 and LG87 must be screwed into the coil by approximately the same amount.

e) Gullwing correction

Use PG14 to adjust the 2nd line from the top so that it is straight on the right and left. Use PG15 to adjust the 2nd line from the bottom. Adjust the vertical shift (function number 00) and picture height (function number 05) back to the correct settings. (The last values stored can be called up again using the green ☐ button.)

6.4 Horizontal shift

Select function number 02. Using the **+** and **–** buttons, shift the centre of the test pattern into the centre of the screen.

6.5 Width

Switch back to function number 01 with the **ZOOM –** button. Adjust the picture width for the relevant zoom stage according to the illustrated test pattern.

6.6 East/West correction

Adjust the outer vertical lines using the following function numbers so that the lines are straight (if necessary, adjust alternately):

06 - East/West correction top and bottom
08 - East/West correction middle
07 - Trapezium top and bottom
09 - Trapezium middle
03 - Parabola top
04 - Parabola bottom.

If necessary, correct the picture width (function number 01). Store the alignment using the red 🔊 button.

7. PIP alignment

7.1 Reference oscillator for PAL

Select the PAL test pattern. In Service Mode select PIP 2 function group and then function number 08. Synchronization of the PAL reference oscillator is now switched off. Using the **+** and **–** buttons select the slowest possible run-through of the colours. Store the alignment with the red 🔊 button.

To switch the synchronization on again, another function group and function number must be selected (e.g. GEOMETRY 4 : 00 with the buttons **4**, **0**, **0** = vertical shift) before switching off Service Mode.

7.2 Reference oscillator for NTSC 3.58 MHz

Repeat the alignment described in 7.1 with an NTSC test pattern. For this purpose select number 09.